Color Management on the HP DesignJet 10/20ps

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Introduction

The HP DesignJet 10/20ps color proofers enable repeatable and accurate color reproduction through the use of a self-calibration feature and color management profiles. International Color Consortium (ICC) profiles are standard files describing the color reproduction characteristics of input and output devices. These profiles can be used by ICC-compliant applications, including desktop publishing programs and RIPs like the DesignJet. ICC profiles can be embedded in certain image types including TIFF, EPS, PDF, and JPEG files, where they identify the color characteristics of images. The embedded profiles help maintain consistent color throughout your workflow and can be read by the HP DesignJet 10/20ps RIP when they are processed.



Perform color correction

The DesignJet RIP software setting that lets you match colors is the "Perform color correction" check box (Figure 1). The default setting is "on" (checked). Turn off color correction (1) if you are printing a color management target to make a color profile of the printer or (2) if you are color-managing images in another application such as Photoshop, a page-layout program, or a workflow application. Otherwise, use the color correction feature to get the color match you want. Settings for individual jobs can be changed by highlighting the job and selecting Job Properties (Figure 2).

ICC input profile

Input profiles describe the color spaces of files to be printed on the DesignJet (Figure 1a). If a file has an embedded ICC profile, the DesignJet RIP reads this file and assigns it as the input profile. Files without embedded ICC profiles are assigned the default ICC input profile you select in RIP.

- **CMYK profile** describes the color space of CMYK images and vector graphics printed on the DesignJet that do not have an embedded CMYK profile.
- **RGB profile** describes the color space of RGB images and vector graphics that do not have an embedded RGB profile.

ICC output profile

The ICC output profile describes the printing characteristics of the HP DesignJet on the print medium selected (Figure 1b).

- **Profile.** Selection of a Medium (top of dialog box) automatically selects the appropriate HP ICC profile for that substrate. The user may also make a custom profile of the medium by printing a color management target on the proofer and reading this target with a profiling program.
- **Rendering Intent.** Rendering intent describes the way out-of-gamut colors are brought into gamut. Use *relative colorimetric* for proofs that do not simulate the paper color and for spot colors, such as PANTONE® named colors. Use *absolute colorimetric* if you would like to simulate the paper color on proofs (e.g., to color the proof background yellow for newsprint or a yellowish paper). *Perceptual* is useful for photographs when the DesignJet print will be the final output.

HOT TIP

RENDERING INTENTS

- **Relative Colorimetric—for proofs without paper simulation and for spot colors**
- **Absolute Colorimetric—for proofs with paper simulation (e.g., a proof for newsprint will have a yellow background)**
- **Perceptual—for photos printed on the DesignJet as final output (not to simulate another process)**

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Color-Managed Workflow

The “Perform color correction” setting enables users of the DesignJet 10/20 to simulate a target printing process using a CMYK profile, or to get printed output that most closely matches the monitor using the input RGB profile. In the following workflow scenarios, assume you are scanning or digitally photographing images, editing them in Photoshop, and printing them on the DesignJet 10/20 in the mode specified (RGB or CMYK).

HOT TIP

WORKFLOW

- **RGB—For prints that match the monitor as closely as possible and where the DesignJet is final output (not intended to simulate another printing process)**
- **CMYK—For prints intended to match a CMYK printing process such as a printing press or CMYK printing device**

RGB Workflow

Use the RGB workflow if you would like to print documents that most closely match their appearance on the computer monitor. You will need ICC profiles of your scanner/camera and a standard working space (sRGB, ColorMatch RGB, or Adobe RGB, in order of increasing color gamut). RGB workflow is outlined on page 4.

If you later send the RGB images to a service provider for high-volume output, these prints should also match the screen if the provider uses an RGB printer or RIP and sets the same standard RGB profile.

CMYK workflow

Use the CMYK workflow if you intend eventually to send your documents to a service provider for quantity output on a printing press or high-volume digital printing device that uses the CMYK color system. The CMYK workflow assumes that both user and service provider aim to print according to a published color specification, such as SWOP, Eurostandard, DIC, or TOYO. The actual profile of the printing press may differ from the specification, however, due to variations in ink, substrate, and printing conditions. The DesignJet 50 can simulate a profiled press (including any deviation from the published specification), while the DJ 10/20 both assume that the user does not have access to the press profile. To proof in CMYK mode in Photoshop, begin with the RGB workflow, then convert your images to CMYK using the steps outlined on page 5.

CMYK Simulation Workflow

The HP DesignJet 50 is designed to simulate a profiled printing process, such as a printing press, halftone-dot proofer, or other CMYK process, even if the target process does not conform to a published printing specification. The DesignJet 50 RIP uses ICC Link profiles to tie two processes together (the DesignJet and the other CMYK printer) so that one (the DesignJet) may simulate the other (the CMYK printer).

DesignJet 10/20 users can simulate a specific CMYK printing device, including any deviation from a published specification, but must use the device’s profile in the CMYK workflow outlined above. For example, suppose you wanted to simulate a halftone dot proof such as a Fuji FinalProof that was calibrated to print differently from SWOP. To do so, you would need a profile of the FinalProof and a custom profile of your DesignJet 10/20 on the substrate you selected. Workflow settings for device simulation are outlined on page 6.

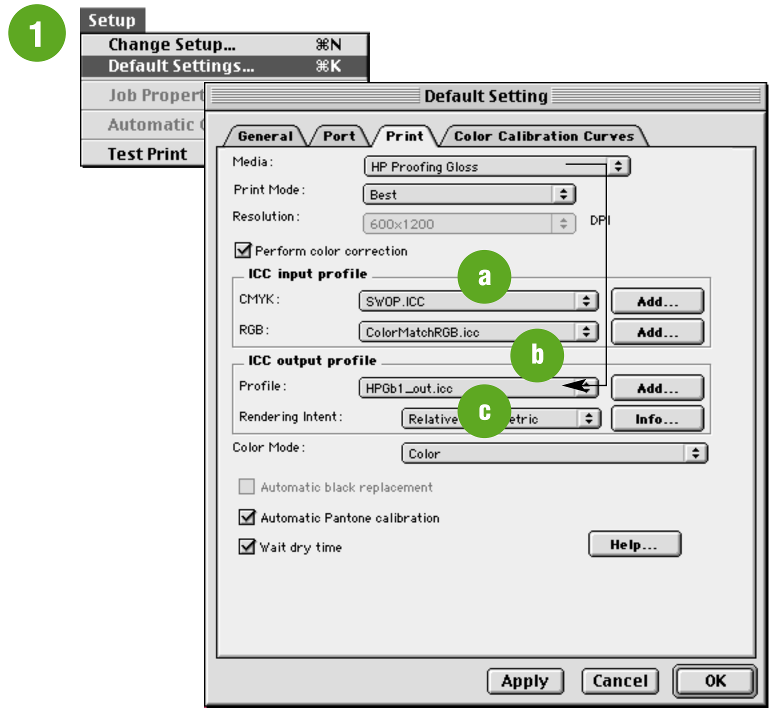
HP DesignJet RIP Software

1. The “Perform color correction” feature of the DesignJet RIP enables you to make proofs that match the monitor or another printing process. Make settings for all jobs in the Default Settings dialog.

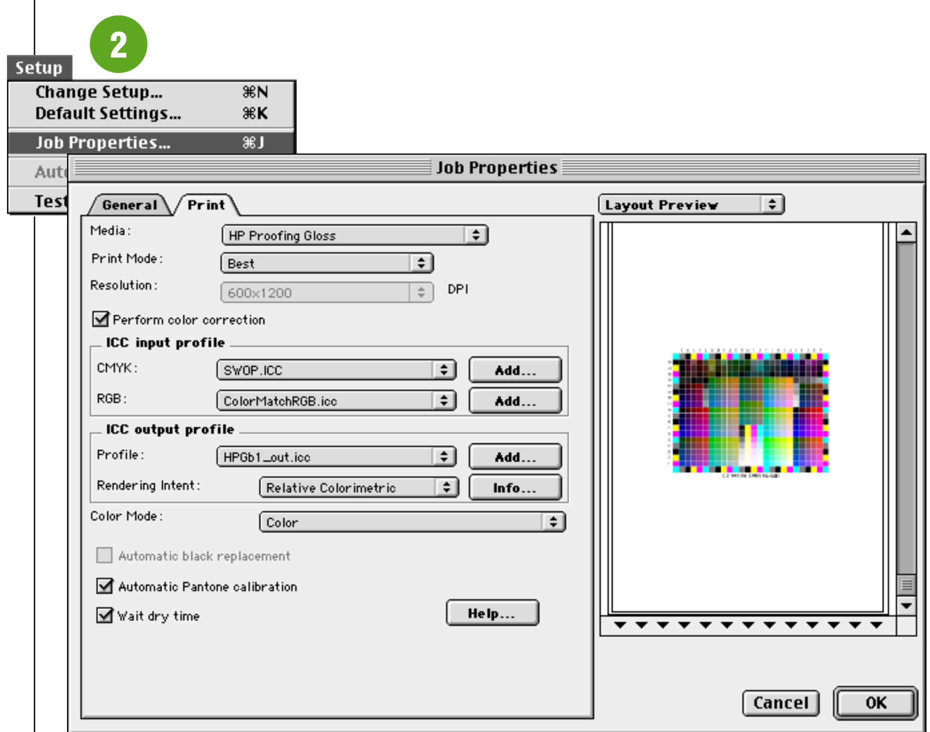
   a. input CMYK profile (unless embedded in images)

   b. input RGB profile (unless embedded in images)

   c. HP DesignJet profile (automatically selected with Media)

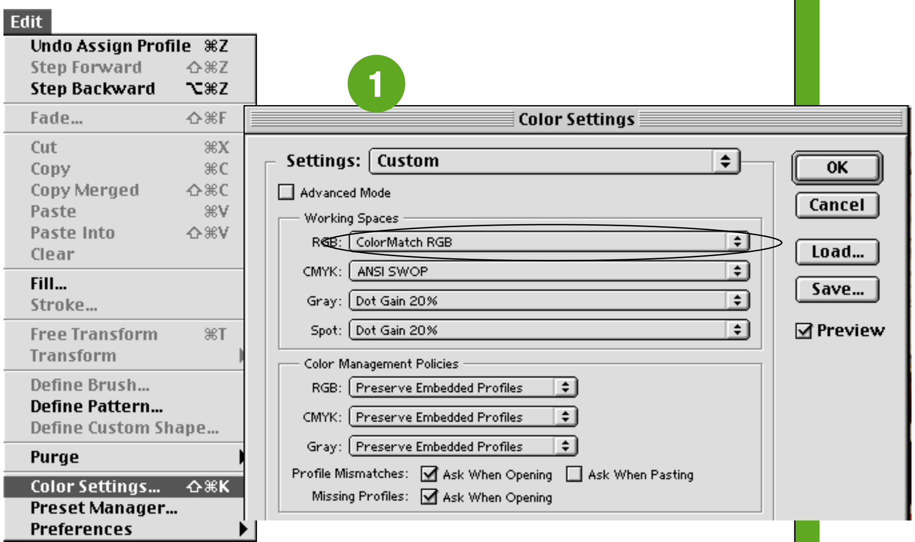


2. Color settings for individual jobs can be changed by selecting the job in the RIP queue and making changes in the Job Properties dialog box.

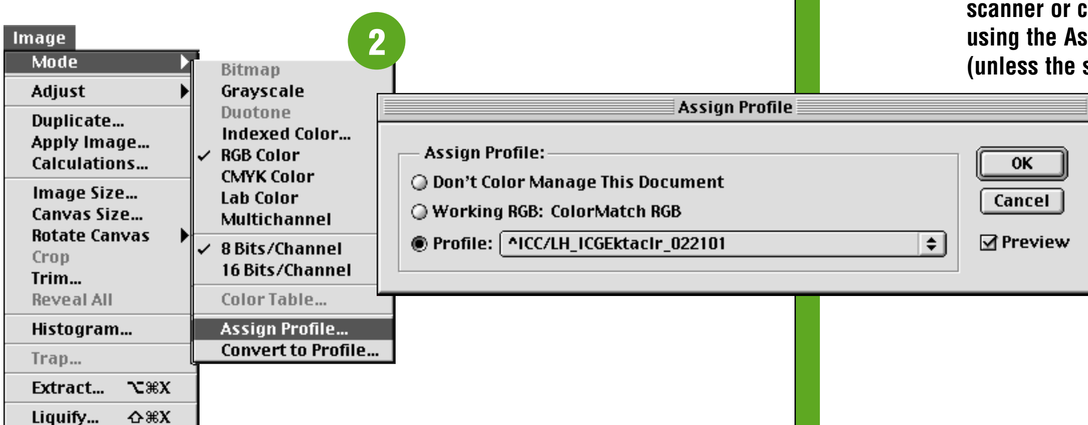


RGB Workflow

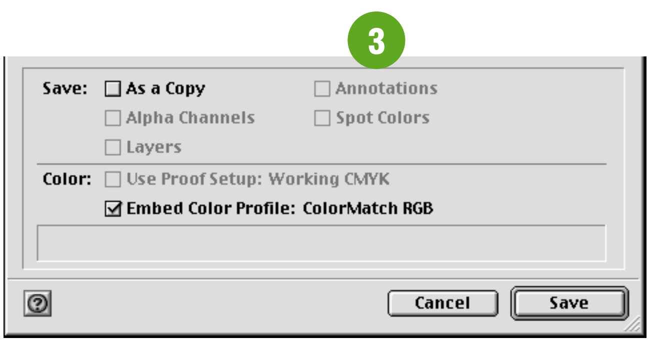
Use the RGB workflow when you want to make prints that match your monitor as closely as possible, and when the DesignJet will provide the final output (i.e., you do not want to simulate another printing process).



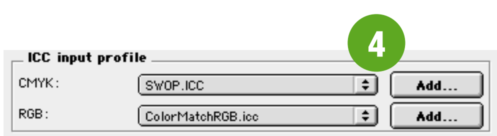
1. Select the RGB working space you want to use in Photoshop's Color Settings dialog box (e.g., sRGB, ColorMatch RGB, or Adobe RGB, in order of increasing color gamut).



2. When scanning or digitally photographing your images, assign the scanner or camera profile to them using the Assign Profile command (unless the scanning software automatically assigns or converts from the profile).



3. When saving the image in RGB mode, embed the color profile. This helps ensure color accuracy throughout the workflow.



4. In the DesignJet RIP software, select the same RGB working space you have used for your photos. (If files have embedded profiles, the DesignJet RIP will use them. If not, it will apply the RGB profile you set in the RIP software.)

5. If you later send the RGB images to a service provider for high-volume output, these prints should also match the screen if the provider uses an RGB printer or RIP and sets the same RGB profile.

Use the CMYK workflow when you want to make prints that match a CMYK printing process such as a printing press or other CMYK printing device.

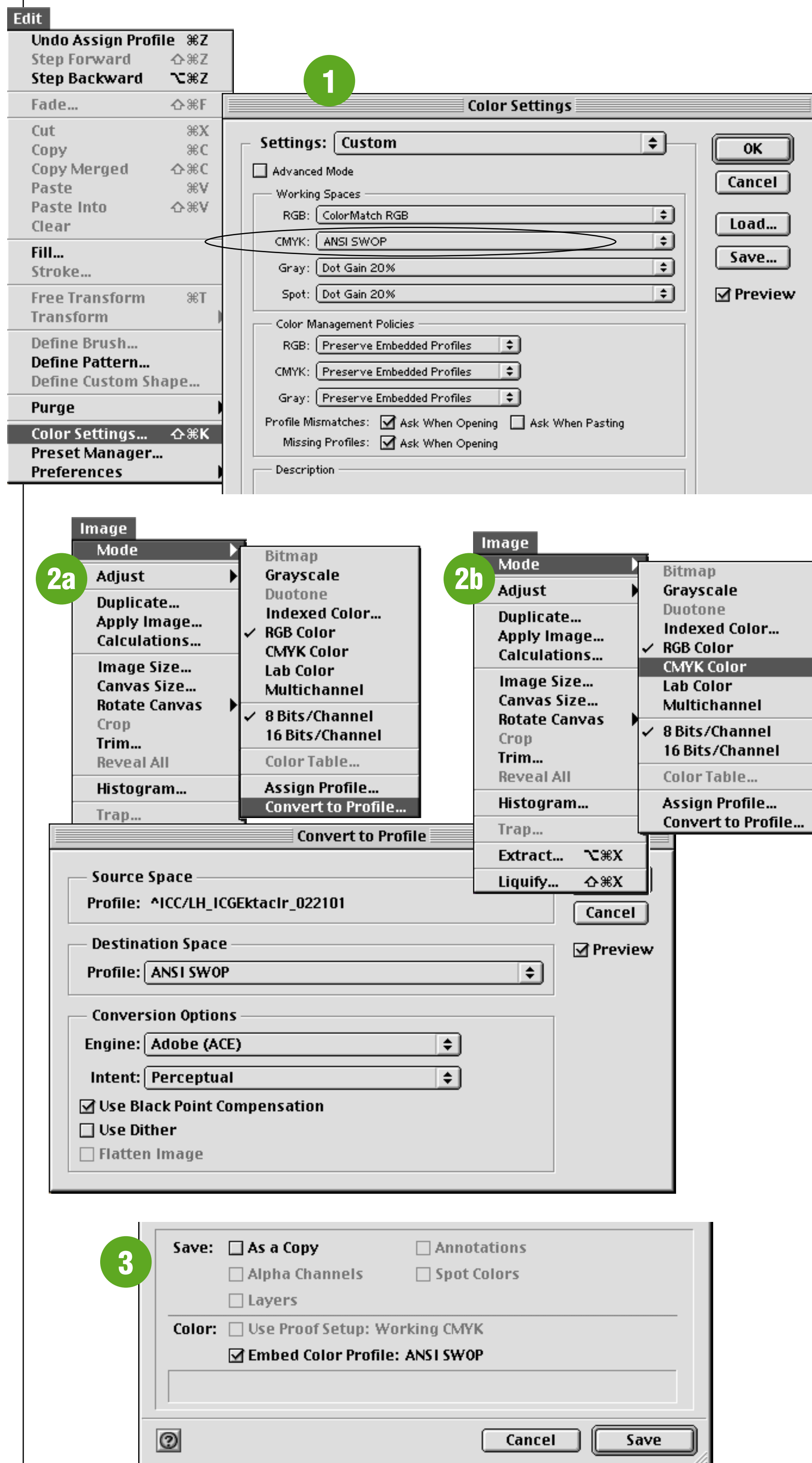
Begin with the RGB Workflow in the previous section, then add the following steps:

1. Select the desired CMYK working space in Photoshop's Color Settings dialog box.

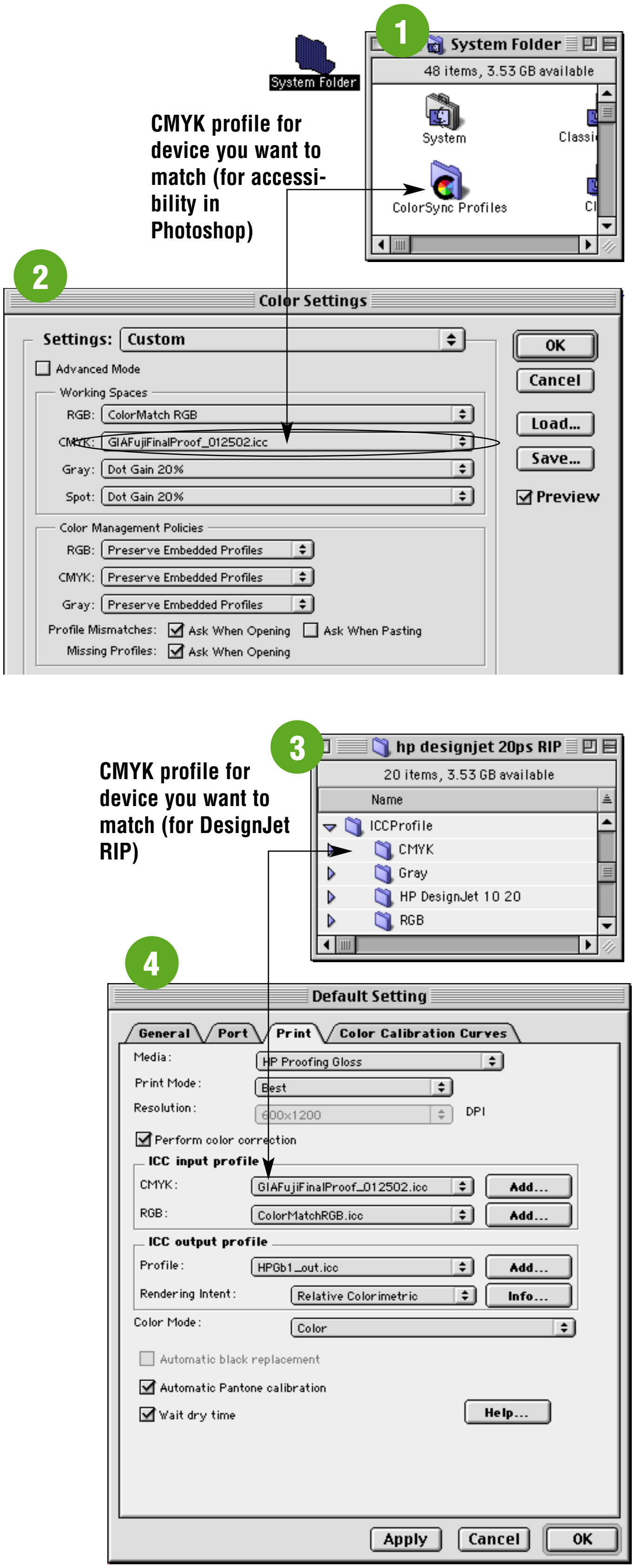
2. Convert images from RGB to CMYK mode using one of two methods:
   a. Convert to Profile, using your standard RGB profile as the Source Space and your printer profile as the Destination Space.
   b. Mode CMYK command, in which the Working Space profiles you chose in Color Settings are the source and destination spaces.

3. When saving CMYK images, embed the profile. This helps ensure consistency throughout the reproduction process.

CMYK Workflow



CMYK Simulation



To get the DesignJet to simulate an analog proofer or printing press, use the following steps:

1. Load the CMYK profile of the process or device you want to match into the ICC profiles folder of your operating system. The profile will then be usable in Photoshop.
   - Macintosh: System>ColorSync Profiles folder
   - Windows 2000: WINNT> System32>Spool>Drivers>Color folder

2. Use the CMYK workflow for Photoshop, but specify the CMYK device you want to match (e.g., Fuji FinalProof) as the CMYK Working Space in Photoshop. Embed the profile when saving the image.

3. Also load the profile into the DesignJet ICC Profile folder:
   - hp designjet 10/20 RIP>ICC Profiles>CMYK, which makes the profile available in the "CMYK input profile" popup menu.

4. Set the CMYK device to be matched (e.g., FinalProof) as the CMYK input profile in the DesignJet RIP software. (If you have embedded the target profile in your CMYK images, the DesignJet RIP will use that profile instead of the default.)

HOT TIP: NTS FOR CLOSER COLOR MATCH

- Select the HP proofing substrate that most closely matches your target process in brightness and gloss.
- Run the self-calibration procedure before printing jobs on the proofer.
- A custom ICC profile of your DesignJet may be required to get the closest possible color match.
- Even after making a custom ICC profile, the profile may need to be edited to adjust for subjective color preferences.